

Last update: 24th March 2004

Level 0 TCU Input Bits

Bit	Set 1 – Minimum Bias & Central Research	Set 2 – Primary Data Taking	Set 3 – Auxiliary Data Taking	Set 4 – Proton-Proton Data Taking
0	CTB Multiplicity > th0	CTB Multiplicity: 1	CTB Multiplicity: 1	CTB Multiplicity > th0
1	CTB Multiplicity > th1	CTB Multiplicity: 2	CTB Multiplicity: 2	(BBC East _{small} ADC > th) AND (BBC West _{small} ADC > th)
2	CTB Multiplicity > th2	BBC TAC diff in window	BBC TAC diff in window	BBC TAC diff in window
3	BBC TAC diff in window	ZDC TAC diff in window	ZDC TAC diff in window	(ZDC East ADC > th and East TAC in window) OR (ZDC West ADC > th and West TAC in window)
4	ZDC TAC diff in window	(BBC East _{small} ADC > th) AND (BBC West _{small} ADC > th)	(BBC East _{small} ADC > th) AND (BBC West _{small} ADC > th)	FPD East > th OR FPD West > th
5	BBC East _{small} ADC > th	(ZDC East ADC > th) AND (ZDC West ADC > th)	(ZDC East ADC > th) AND (ZDC West ADC > th)	BEMC/EEMC adjacent jet patch trigger
6	BBC West _{small} ADC > th	(ZDC East TAC in window) AND (ZDC West TAC in window)	(ZDC East TAC in window) AND (ZDC West TAC in window)	BEMC Hi-Tower: 1
7	ZDC East ADC > th	ZDC E+W attenuated ADC sum > th	ZDC E+W attenuated ADC sum > th	BEMC Hi-Tower: 2
8	ZDC West ADC > th	Zero Bias bit	Zero Bias bit	BEMC Jet Patch: 1
9	ZDC East TAC in window	Blue + Yellow bunches filled	Blue + Yellow bunches filled	BEMC Jet Patch: 2
10	ZDC West TAC in window	BEMC Hi-Tower: 1	BBC large ADC > th	EEMC Hi-Tower: 1
11	ZDC E+W attenuated ADC sum > th	BEMC Hi-Tower: 2	BEMC Hi-Tower: 2	EEMC Hi-Tower: 2
12	Zero Bias bit	EEMC Hi-Tower: 1	UPC	EEMC Jet Patch: 2
13	Blue bunch filled	EEMC Hi-Tower: 2	EEMC Hi-Tower: 2	J/Ψ
14	Yellow bunch filled	FPD East > th OR FPD West > th	J/Ψ	Blue + Yellow bunches filled
15	Special Trigger Flag (Off)	Special Trigger Flag (Off)	Special Trigger Flag (Off)	Zero Bias bit

NOTE:

- The 2 bits, CTB Multiplicity: 1 and CTB Multiplicity: 2, encode a number between 0 and 3 indicating which of 3 thresholds were exceeded.
- The 2 bits, Hi-Tower: 1 and Hi-Tower: 2, encode a number between 0 and 3 indicating which of 3 thresholds were exceeded.
- The 2 bits, Jet Patch: 1 and Jet Patch: 2 encode a number between 0 and 3 indicating which of 3 thresholds were exceeded.

- The UPC bit is calculated by putting a window around each ZDC ADC value (e.g. around the single neutron peak) and a window on the CTB multiplicity (e.g. to select valid low multiplicity events) and then combining these three bits with the CTB topology bit:

UPC = (Both ZDC ADCs in window) AND (CTB multiplicity in window OR topology bit set)

- The J/Ψ bit is set if two opposite jet patches in the West half of BEMC have high towers above a user-selected threshold.
- The adjacent jet patch bit is set if two adjacent jet patches in either the BEMC or the EEMC have energies over a user-selected threshold.
- The Zero Bias bit is set every Nth bunch crossing, where N is defined from registers in the Run Control GUI
- The Special Requests are common to the first three sets and absent from the fourth (pp) set. If the Special Trigger Flag is ON then the TCU input bits have the following definitions:

Bit	Special Requests
0	Req. bit 0
1	Req. bit 1
2	Req. bit 2
3	Detector ID bit 0
4	Detector ID bit 1
5	Detector ID bit 2
6	Detector ID bit 3
7	Random Bit
8	
9	
10	
11	
12	
13	
14	
15	Special Trigger Flag (On)

- The Random Bit has an average rate that is also controlled from registers in the Run Control GUI